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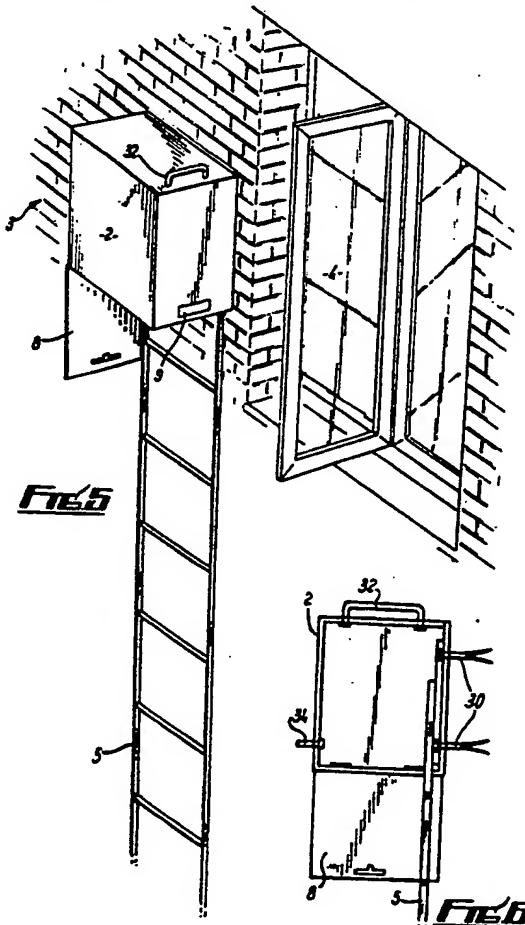
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(56) Documents cited  
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## (54) Fire escape ladder

(57) An extendible ladder 5 is stowed in a casing 2 which is surface-mounted on or flush-mounted in an external wall 3 of a building above or alongside the window. In an emergency, the ladder is released from the casing, and self-extends down to ground level to provide an escape route. The ladder release arrangement preferably comprises a normally-closed hatch 8 in the bottom of the casing, the hatch being released to drop open and allow the ladder to deploy under its own weight. Automatically actuated alarms and/or lights can be incorporated. Means may also be provided to re-stow the ladder, and this may be manually actuated or powered. Remote control actuation of release and/or stowing of the ladder may be provided for.



At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

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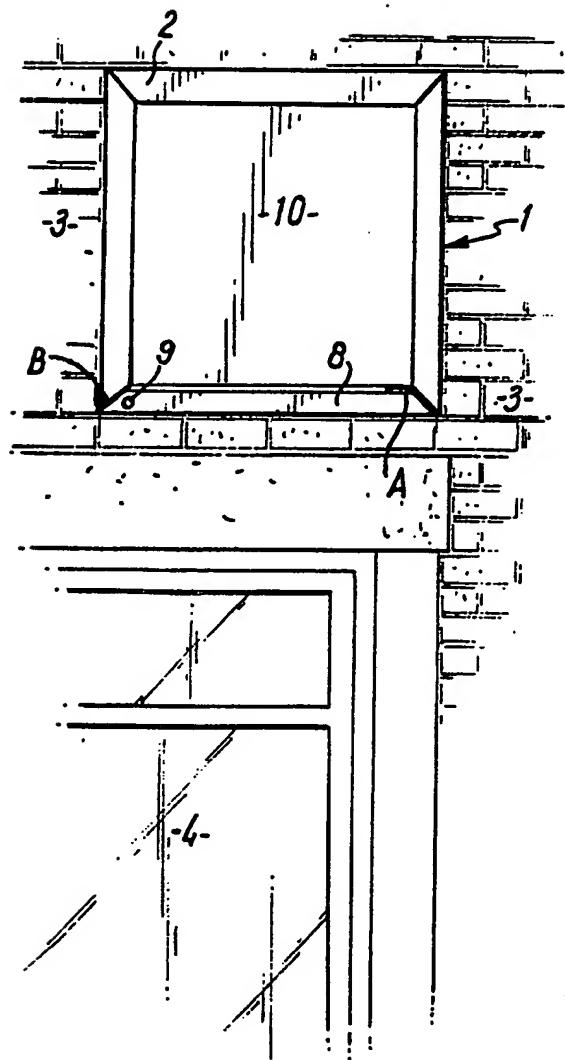


FIG. 1

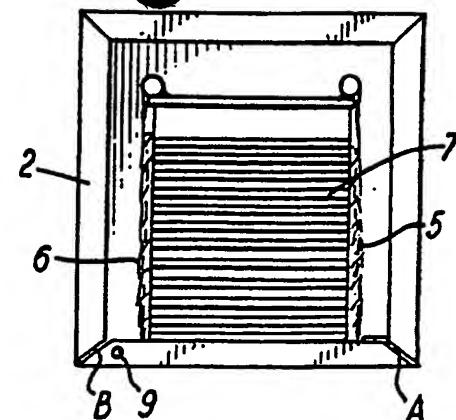


FIG. 2

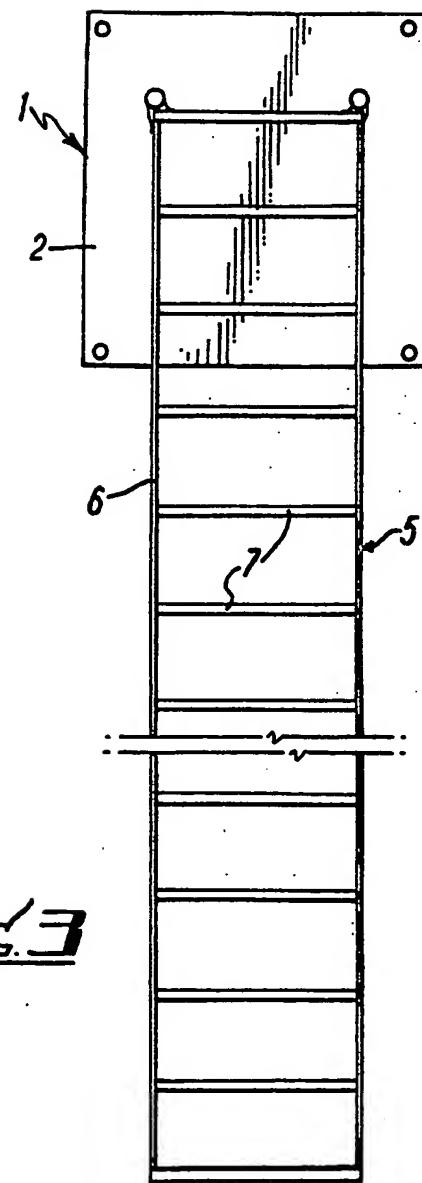
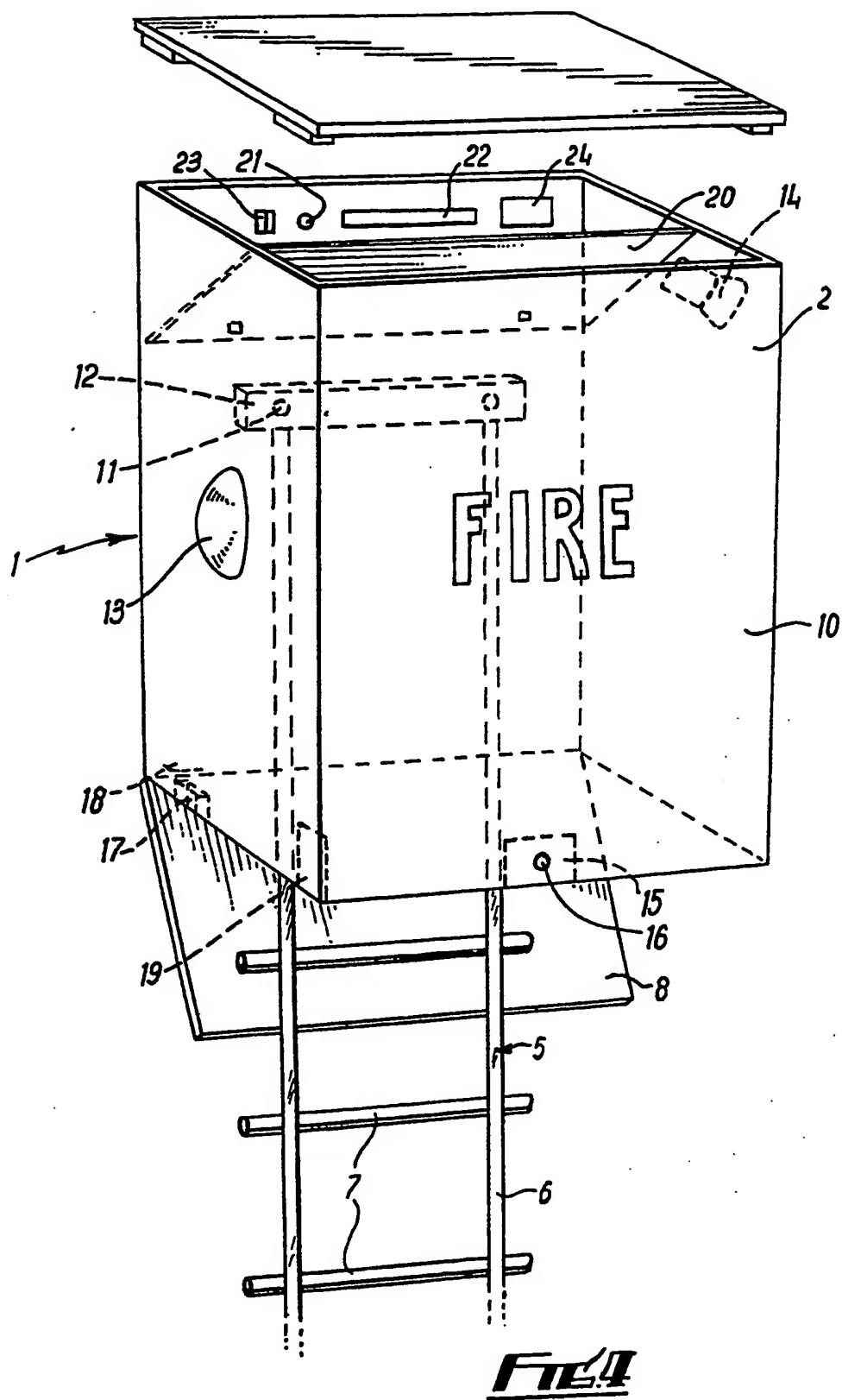


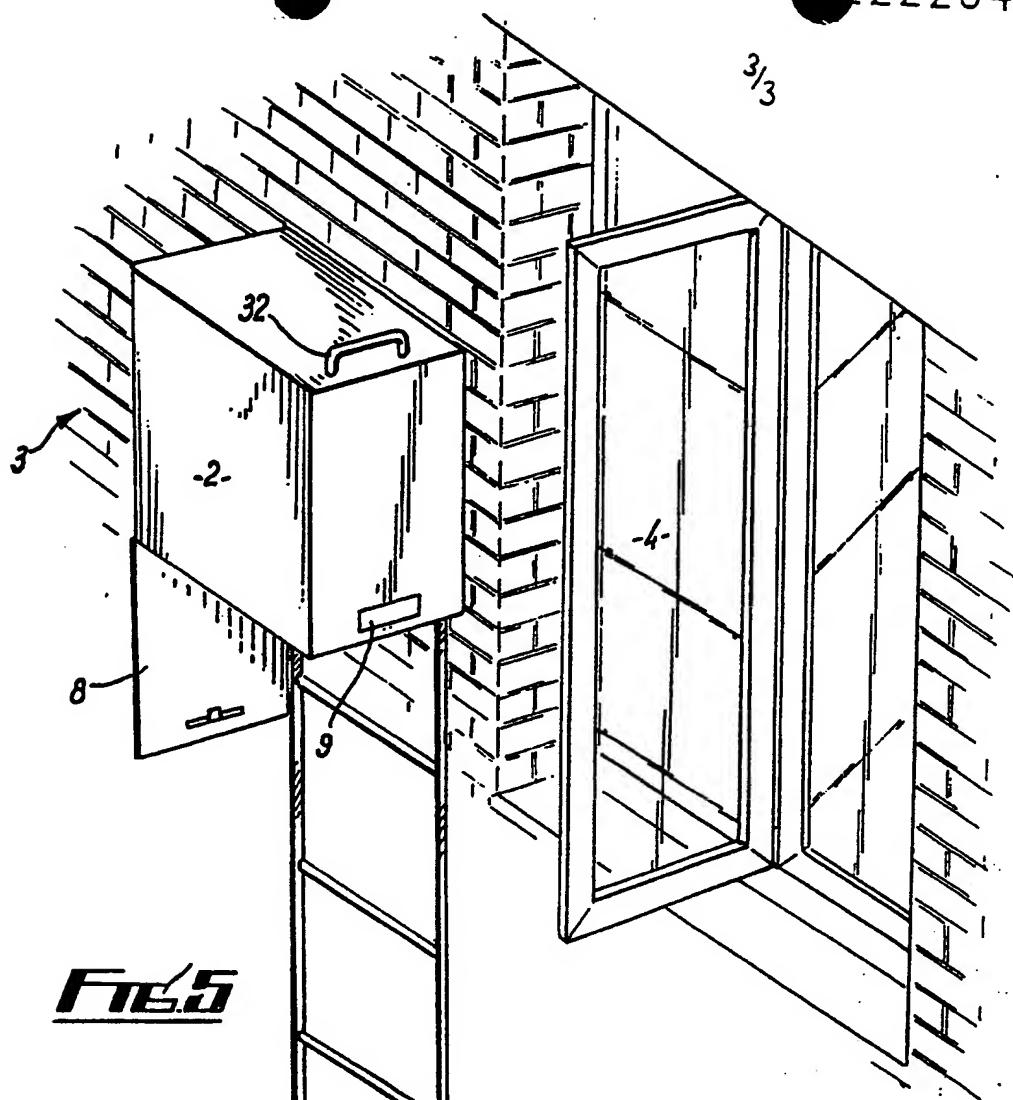
FIG. 3

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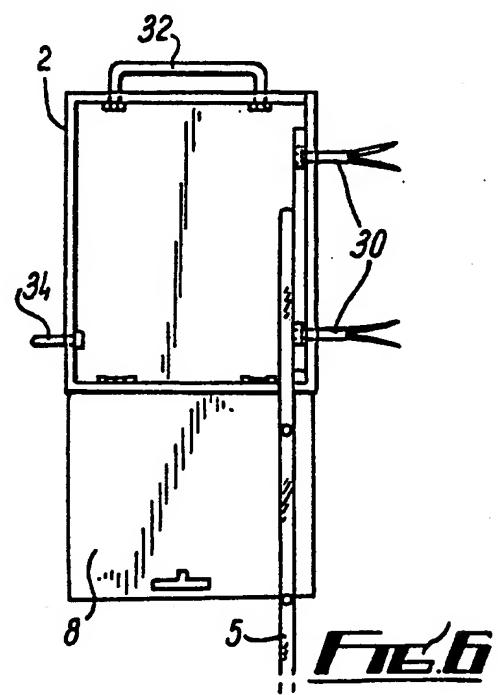
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*FIG. 5*



*FIG. 6*

Fire Escape Apparatus

This invention relates to a fire escape apparatus.

More specifically, this invention relates to a ladder arrangement for enabling emergency evacuation from an upper storey or other above-ground portion of a building or other structure, such as may be required during a fire or other disaster which inhibits exit from the building by a more conventional route (for example, the normal stairs).

Certain conventional fire escapes are not permanently attached to the building or other structure and thus not readily accessible particularly to those trapped in the building during a fire. Other more traditional fire escapes are cumbersome and have to be permanently in place which increases the risk of burglary by providing ready access to upper storeys. Other known safety ladders and stairways have to be assembled prior to egress, which can waste valuable time, whereas certain known ladders are limited in their use owing to their storage location inside the structure, in which position they are more susceptible to the fire and cannot be accessed by rescuers outside the building.

It is an object of the invention to provide a fire escape apparatus which obviates or mitigates the above-mentioned disadvantages.

According to the present invention there is provided a fire escape apparatus for enabling escape from a building or other structure, the fire escape apparatus comprising a casing attached to the exterior of the building or other structure adjacent an above-ground window or other egress of said building or structure, an extendible ladder normally stowed and retained within said casing, one end of the ladder being directly or indirectly anchored to the building or other structure, and release means selectively operable to release the ladder from retention within the casing to depend from the casing whereby the ladder provides an escape path to ground level from the window or other egress.

Preferably, the ladder has flexible fabric sides and substantially rigid rungs, preferably of metal or wood, and is stowed concertina-fashion within the casing until released and deployed.

Preferably, the release means comprises a hatch provided in the bottom of the casing, which hatch is openable to release the stowed ladder which then unfurls and extends downwards under its own weight.

Preferably, the ladder is of a length to reach substantially down to ground-level.

The hatch may be opened by a person within or outwith the building or other structure, hatch opening being controlled either by mechanical means (the hatch having a release ring which is engageable by a hook that may be handled from inside or outside the building or other structure) or else

by electronic means, ultrasonic means, or infrared means wherein a receiver operatively associated with the hatch receives a beamed signal that initiates hatch opening and ladder release.

Preferably, the escape apparatus includes alarm means, and the actuation of hatch opening simultaneously actuates the alarm means, which may be in the form of a flashing or sustained light and/or an audible alarm, (for example a siren), preferably situated on or near the apparatus. The release means for releasing the hatch may be operatively associated with actuating means for actuating the alarm means; the release means and the actuating means may have a common user-activated push-switch or other control internal or external to the building or other structure, which push-button or other control breaks an electric circuit governing the actuation of hatch opening and the actuation of the alarm means. The light may help those who are partially sighted to descend the ladder, as well as alerting neighbours and passers-by of the fire in the building.

Preferably, the casing is attached over or to one side of the window or other egress: the casing may either be surface-mounted to stand proud of the external wall of the building or other structure or be sunken into the body of the building or other structure to lie flush with the external wall, and in the latter case a spacer bar is preferably provided on the external wall to keep the ladder clear of the wall when deployed. The casing may be fabricated of metal.

Embodiments of the present invention will now be described, by way of example, with reference to the accompanying drawings in which:-

Fig. 1 is a front elevation of a first embodiment of fire escape apparatus according to the present invention, attached to the exterior of a structure and in its undeployed configuration;

Fig. 2 is a view of the apparatus of Fig. 1 with the front panel of its casing removed and with the ladder in its stowed configuration;

Fig. 3 is a view of the apparatus of Fig. 2 with the front and side panels of its casing removed and with the ladder in its deployed configuration;

Fig. 4 is a schematic perspective view of a second embodiment of fire escape apparatus according to the present invention;

Fig. 5 is a schematic perspective view of a third embodiment of the fire escape apparatus in accordance with the present invention; and

Fig. 6 is a side view of the third embodiment with the nearest side of its casing removed.

Referring to the drawings, there is shown fire escape apparatus suitable for emergency evacuation from a building or other structure, such as a house, via a window in an upper storey, such as may be required during a fire or some other disaster. When the fire escape apparatus is activated, people within the building can escape and in the case of infirm or young children, neighbours or passers-by can guide them safely to ground level. In the event of unlawful release (e.g. by a burglar), the same system will alert neighbours of the intruder by means of associated alarm devices.

The apparatus when fitted to elderly people's homes can also act as a distress call for assistance in the event of illness or accident.

The apparatus 1 of Figs. 1 to 3 comprises a casing 2, which is permanently and securely attached to the exterior of the house 3 at an above-ground location. The casing 2 is mounted adjacent an egress of the house 3, such as an upper-storey window 4. The casing 2 retains an extendible ladder 5 and is provided with means to release the ladder 5 such that the ladder 5 deploys and extends substantially to ground-level thereby to provide an escape path from the upper storey of the house 3 to ground level.

The ladder 5 has flexible sides 6 supporting rigid metal rungs 7 and is stowed in a folded concertina-fashion within the casing 2 until release and deployment. The release means is a hatch 8 in the bottom of the casing 2. When the hatch 8 is opened, the ladder 5 unfurls and thus extends downwards under its own weight. The ladder 5 is preferably of a length to reach ground-level, but may be slightly shorter or longer than this without detracting from its ability to be used as an escape route.

The hatch 8 is hinged at one edge A and provided with an opening catch at the other edge B, which catch comprises a ring 9 through which a hook (not shown) can be inserted and twisted to release the catch. The hatch 8 may be opened both by persons inside the house and by persons outside the house since the hook can be handled by people within the house, by leaning out of the window 4, or by those at ground-level, the handle of the hook being provided with an extension to reach the ring 9 from ground-level.

In an alternative embodiment (not shown), the ring 9 and hook are replaced by electronic or ultrasonic or infrared transmitters and receivers wherein a receiver in the hatch 8, on reception of a beamed signal, releases the catch.

In the second embodiment shown in Fig. 4, parts in common with the embodiment of Figs. 1 to 3 bear the same reference numeral. In the embodiment of Fig. 4, the ladder 5 is attached to the wall of the house 3 through the back of the casing 2 by means of wall fixing bolts 11 and a clamp bar 12. The release means to release the hatch 8 is associated with actuation means of alarm devices, which include a hazard light 13 and an audible alarm 14.

The release means to release the hatch 8 are electronic and include a solenoid 15 which is actuated by a switch (not shown) within the house; in case of failure of the electronic system or lack of access to the property, the hatch 8 is also provided with a manual release 16.

The electrical system includes a micro-switch 17 (with a guard 18 for mechanical protection of the micro-switch 17), to recognise release of the hatch 8 and actuate the alarm devices. When not actuated the hatch 8 is retained in position by various stops 19.

The electrical system within the casing 2 is protected from damage by the ladder 5 by virtue of a safety cover 20 which internally divides the casing 2 into a ladder-holding compartment and an electrical compartment. A mains cable 21 feeds into the electrical compartment which houses a terminal block 22, a release plunger 23, and a flash unit control 24 for the hazard light 13.

Referring now to Figs 5 and 6, these illustrate a third embodiment of fire escape apparatus in accordance with the invention. The third embodiment is generally similar to the first and second embodiments, and differs mainly in the arrangement of its components to suit being mounted alongside the window 4. Parts of the third embodiment which

correspond to parts of the first and second embodiments are given the same reference numerals.

As shown in Fig 5, the ladder casing or housing 2 is externally mounted on the wall of the building 3, to the right of the window 4 (from the point of view of a person inside the building). As before, the flexible-sided extendible ladder 5 is normally held within the casing 2, wherein it is anchored at one end to the building 3 by means of rag bolts 30 (Fig. 6) passing through the back of the casing 2 and into the building wall wherein they are securely retained. As an alternative to this form of direct anchoring of one end of the ladder 5 to the building wall, the ladder end could be indirectly anchored by being secured to the casing 2, which in turn is anchored to the building wall. Any other suitable form of direct or indirect anchoring of the ladder end can also be employed.

To suit the mounting of the casing 2 to one side of the window 4, the hatch 8 is hinged on the left side of the casing 2 (as viewed from outside the building 3 and looking towards it). This gives relatively unimpeded access from the window 4 to the ladder 5, as shown in Fig. 5.

To assist in the transition of a person from the window 4 to the ladder 5, the casing 2 may be provided with one or more handles or hand-grips such as the top edge hand-grip 32 (Fig. 5) or top and front face handles 32, 34 (Fig. 6).

In the illustrated embodiments the casing 2 stands proud of the wall. In alternative embodiments (not shown), the casing 2 is sunken into body of the wall, such that the front panel 10 is flush with the wall. In these embodiments, a spacer bar is preferably provided on the external wall to keep the ladder 5 clear of the wall when deployed.

In still further embodiments (not shown), the escape apparatus incorporates selectively actuatable re-folding or re-winding means which enables the deployed ladder to be re-folded or re-wound for re-stowage within its casing. The re-folding or re-winding means may be manually actuatable, for example by a handle, or be power-driven and controlled by remote operation, for example by electronic means, an ultrasonic receiver, or an infrared receiver in the casing and disposed to receive a beamed initiating signal.

Besides application to domestic dwellings, the fire escape apparatus of the invention may be applied to commercial dwellings and residences (e.g. hotels, boarding houses, hostels, nursing homes), offices, shops, factories, mills, warehouses, and any other premises or structure for which the provision of the above-ground egress in an emergency is mandatory or desirable.

While certain modifications and variations have been described above, the invention is not restricted thereto, and other modifications and variations can be adopted without departing from the scope of the invention as defined in the appended claims.

CLAIMS

1. Fire escape apparatus for enabling escape from a building or other structure, the fire escape apparatus comprising a casing attached to the exterior of the building or other structure adjacent an above-ground window or other egress of said building or other structure, an extendible ladder normally stowed and retained within said casing, one end of the ladder being directly or indirectly anchored to the building or other structure, and release means selectively operable to release the ladder from retention within the casing to depend from the casing whereby the ladder provides an escape path to ground level from the window or other egress.
2. Fire escape apparatus as claimed in Claim 1 wherein said extendible ladder has flexible fabric sides and substantially rigid rungs.
3. Fire escape apparatus as claimed in Claim 1 or Claim 2 wherein said extendible ladder is stowed concertina-fashion within the casing until released and deployed.
4. Fire escape apparatus as claimed in any preceding claim wherein said release means comprises a hatch provided in the bottom of the casing which hatch is openable to release the stowed ladder such that it unfurls and extends downwards under its own weight.
5. Fire escape apparatus as claimed in Claim 4 wherein the ladder is of a length to reach substantially down to ground-level.
6. Fire escape apparatus as claimed in Claim 4 or Claim 5 wherein hatch opening is controlled by mechanical means,

with the hatch having a release ring which is engaged by a hook that may be handled from inside or outside the building or other structure.

7. Fire escape apparatus as claimed in Claim 4 or Claim 5 wherein hatch opening is controlled by electronic means, ultrasonic means, or infrared means wherein a receiver operatively associated with the hatch receives a beamed signal that initiates hatch opening and ladder release.

8. Fire escape apparatus as claimed in any of Claims 4-7, wherein the escape apparatus includes alarm means, and the actuation of hatch opening simultaneously actuates the alarm means.

9. Fire escape apparatus as claimed in Claim 8 wherein the alarm means comprises a flashing or sustained light and/or an audible alarm.

10. Fire escape apparatus as claimed in Claim 9 wherein the release means for releasing the hatch is operatively associated with actuating means for actuating the alarm means.

11. Fire escape apparatus as claimed in Claim 10 wherein the release means and the actuating means have a common user-activated push-switch or other control internal or external to the building or other structure, the push-switch or other control being connected to break an electric circuit governing the actuation of hatch opening and the actuation of the alarm means.

12. Fire escape apparatus as claimed in any preceding Claim wherein the casing is attached over or to one side of the window or other egress.

13. Fire escape apparatus as claimed in any preceding Claim wherein the casing is surface-mounted on an external wall of the building or other structure to stand proud thereof.
14. Fire escape apparatus as claimed in any of Claims 1-12 wherein the casing is sunken into the body of the building or other structure to lie flush with an external wall thereof.
15. Fire escape apparatus as claimed in Claim 14 wherein a spacer bar is provided on the external wall of the building or other structure to keep the ladder clear of the wall when the ladder is deployed.
16. Fire escape apparatus as claimed in any preceding Claim wherein the apparatus further included re-folding or re-winding means which enables the deployed ladder to be re-folded or re-wound for re-stowage within the casing.
17. Fire escape apparatus as claimed in Claim 16 wherein the re-folding or re-winding means is manually actuatable.
18. Fire escape apparatus as claimed in Claim 16 wherein the re-folding or re-winding means is power-driven and controlled by remote operation.
19. Fire escape apparatus as claimed in Claim 18 wherein said power-driven re-folding or re-winding means is controlled by electronic means, or an ultrasonic receiver, or an infrared receiver in the casing and disposed to receive a beamed initiating signal.
20. Fire escape apparatus substantially as hereinbefore described with reference to and as shown in Figs 1, 2, and 3, or Fig 4, or Figs 5 and 6 of the accompanying drawings.